

## Make It@Home: Cipher Wheel

### A. Materials

- |                              |              |
|------------------------------|--------------|
| 1 2-Liter Soda Bottle, empty | Black marker |
| Graph paper, several sheets  | Clear Tape   |
| Construction Paper           | Scissors     |
| Measuring tape               | Pencil       |

### B. How To Make A Cipher Wheel

1. With the soda bottle standing upright, find the circumference of the bottle by wrapping the measuring tape around the middle of the bottle.
2. Using the graph paper, measure 10 columns that are an inch longer than the circumference of the bottle.
3. Measure the width of 2 of these sections and write it down. We will use this measurement later.
4. Using a ruler, divide each strip into 26 even sections.
5. For the first strip, write a letter of the alphabet in each section. Make sure you use all 26 letters of the alphabet.
6. Follow STEP 4 for the remaining columns. Make sure that ONLY one column is in alphabetical order while the others are scrambled each time you start a new column.
7. Cut out the 10 columns of paper so that you have 10 strips of paper.
8. Take one of the strips of paper and wrap it around the outside of the bottle. Tape the two ends together so that the strip spins around bottle freely.
9. Continue with the remaining strips.
10. Cut a piece of construction paper that is as long as the bottle and has the same width as the measurement you recorded earlier in STEP 4.
11. Attach one end of the construction paper to the top of the bottle with tape, then loosely tape the other end to the bottom of the bottle. Make sure that the construction paper is on straight before you tape it down!

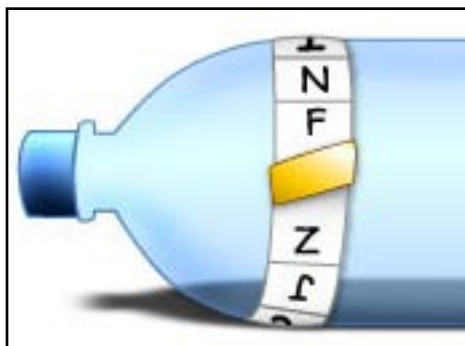
**CONGRATULATIONS! YOU HAVE MADE YOUR CIPHER WHEEL!**  
**NOW YOU'RE READY TO ENCRYPT A MESSAGE!**



**Step 1**

A	H	O	N	J	M
B	M	F	G	N	S
C	I	H	J	R	V
D	F	I	Q	M	P
E	G	K	M	K	W
F	C	M	L	O	R
G	E	G	H	T	N
H	J	L	I	Q	T
I	K	J	O	L	U
J	L	N	P	S	O
K	D	E	K	P	Q

**Steps 2-7**



**Step 8**



**Steps 9-11**

## C. How To Encrypt A Message

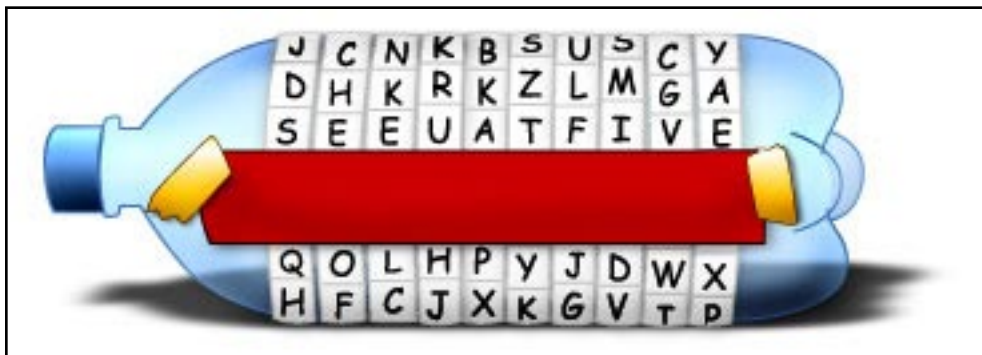
1. Beginning with the first strip on the left, rotate the strips until your 10-letter message is visible in the row above the construction paper.
2. Copy the row of scrambled letters located just beneath the construction paper. This will be the ciphertext you send to a friend.

### Example:

PLAINTEXT: SEEUATFIVE

CIPHERTEXT: QOLHPYJDWX

3. If you want to write a message that is longer than 10 letters, repeat STEPS 1 and 2 until you have encrypted the entire message.



**Step 1**

## D. How To Decrypt A Message

**NOTE:** Make sure that the person receiving your message has an identical cipher wheel or else they won't be able to decipher the message! This means that they have to have the same number of strips with identical scrambled alphabets written on each strip. Also, each strip must be placed around the bottle in the same order as yours!

1. Arrange, in order, each letter of the encrypted message below the construction paper.
2. Looking at the line above the construction paper, read the deciphered message.